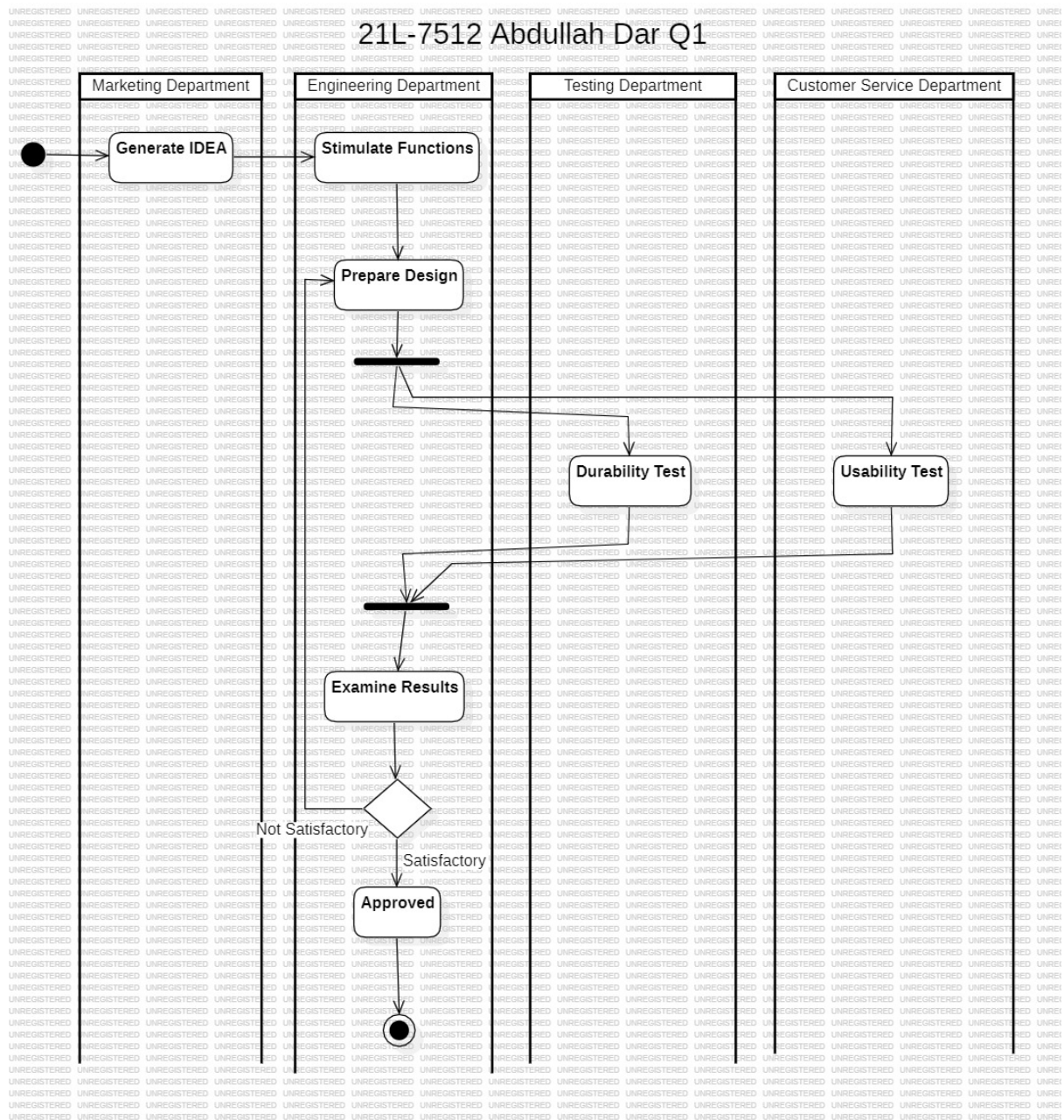**21L-7512**   **Abdullah Dar**   **BSCS-5G**

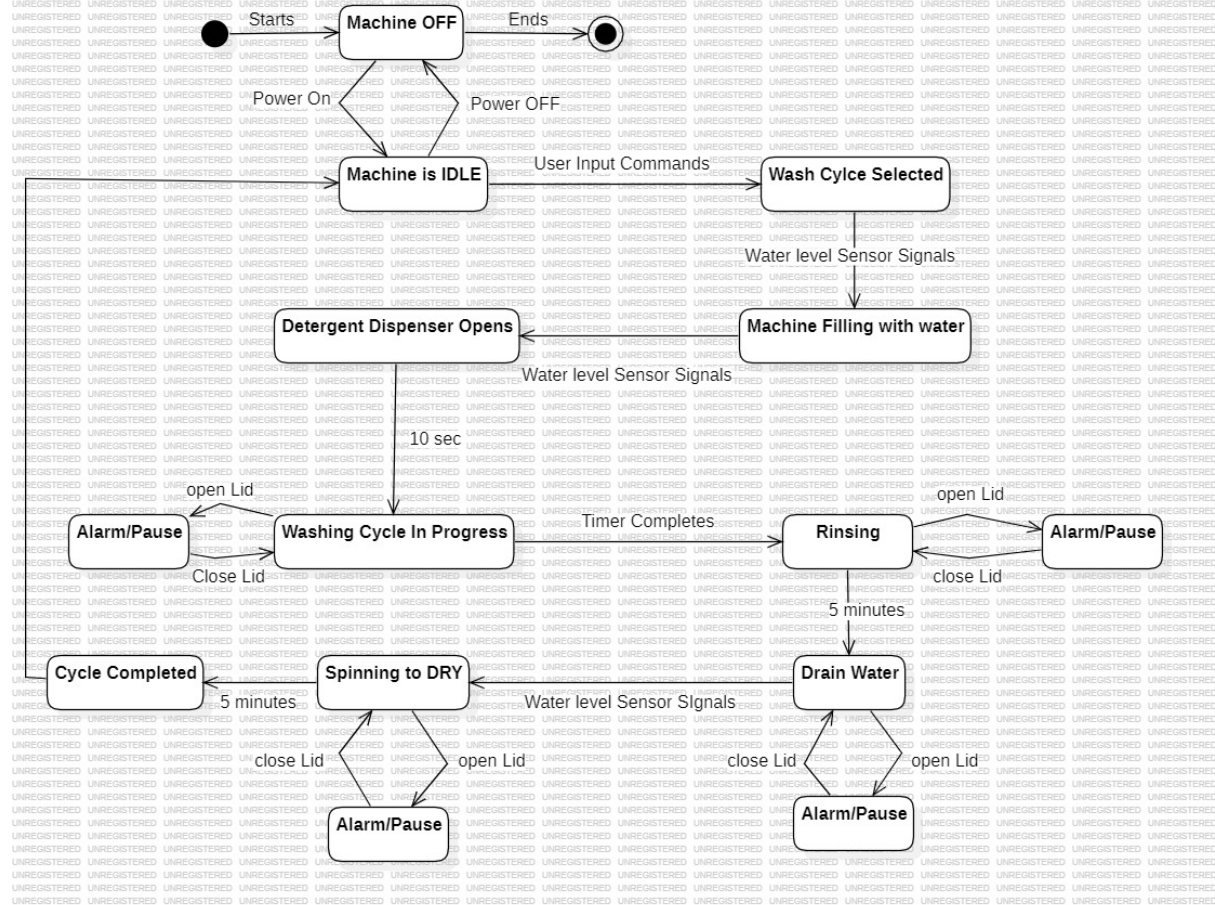# Software Design and Analysis

Assignment no: 3

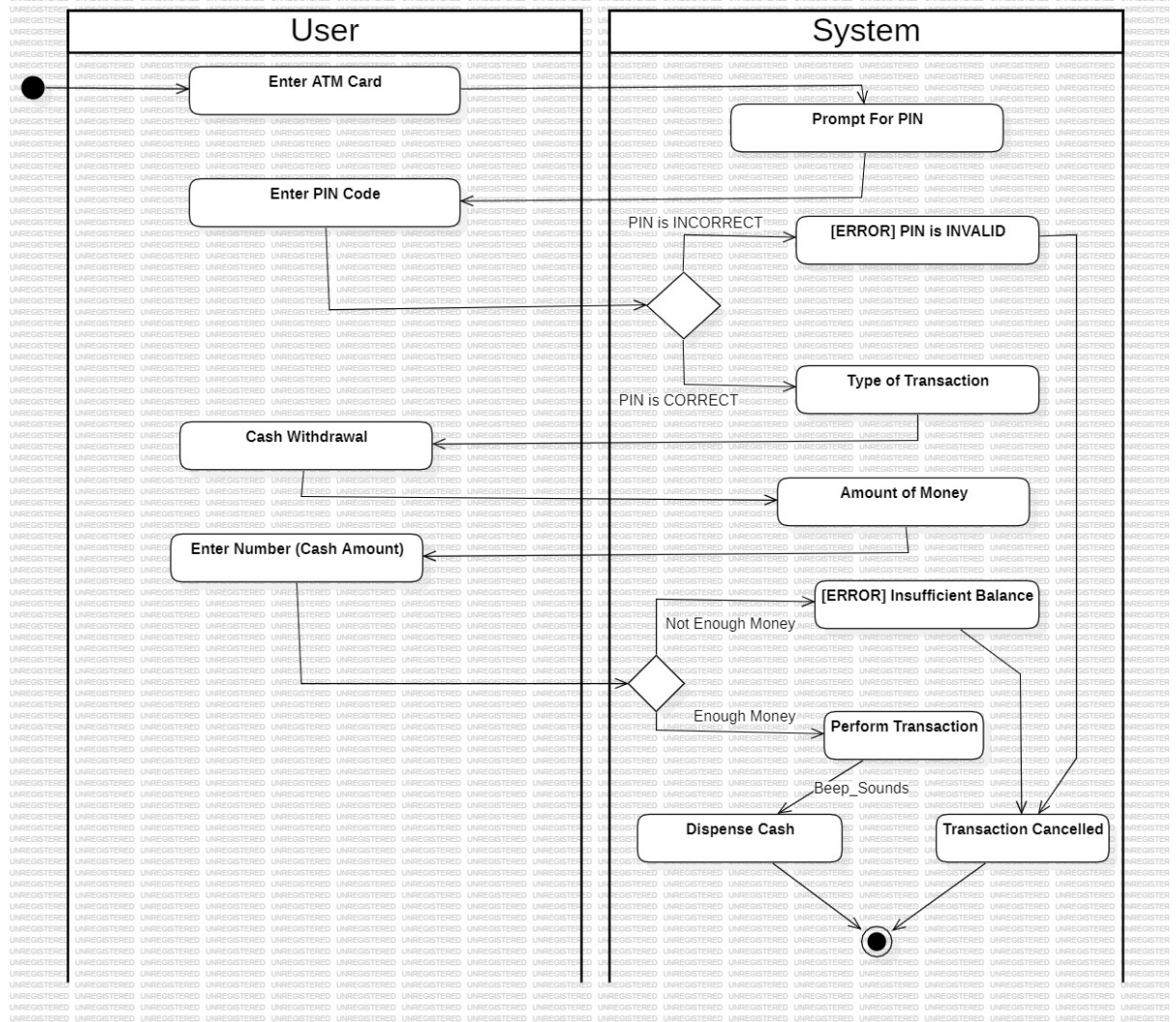**Question no: 1: Swim-lane activity diagram**

Question no: 2: State diagram for the any automatic washing machine near you.
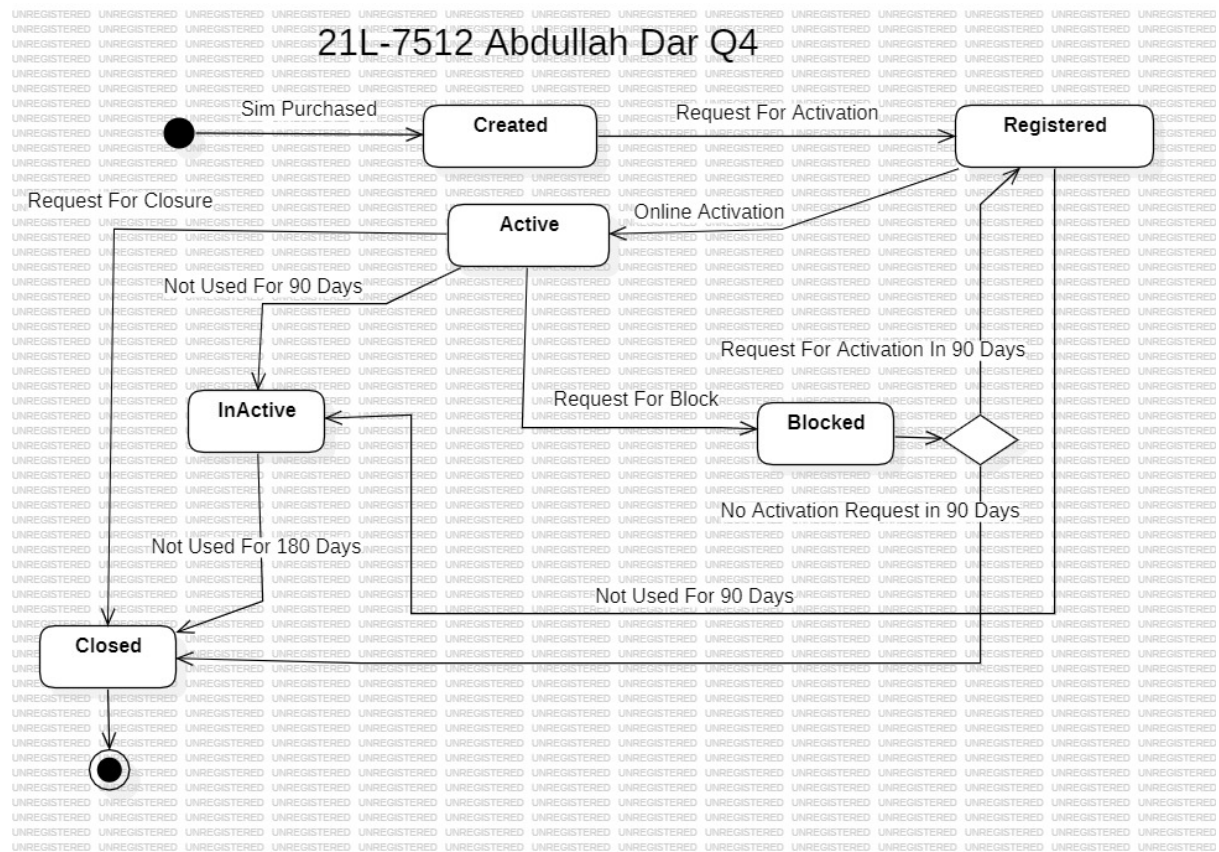

21L-7512 Abdullah Dar Q2

Question no :3: Activity Diagram

21L-7512 Abdullah Dar Q3

User	System
Enter ATM Card	Prompt For PIN
Enter PIN Code	[ERROR] PIN is INVALID
	Type of Transaction
Cash Withdrawal	Amount of Money
Enter Number (Cash Amount)	[ERROR] Insufficient Balance
	Perform Transaction
	Dispense Cash — Transaction Cancelled

PIN is INCORRECT

PIN is CORRECT

Not Enough Money

Enough Money

Beep_Sounds

Question no: 4: State Diagram

21L-7512 Abdullah Dar Q4

Question no: 5: Use virtual inheritance to resolve the diamond problem.

Code:

```cpp
#include <iostream>
#include <string>

using namespace std;

class Person {
protected:
    string name;

public:
    Person(const string& n) : name(n) {}

    virtual void print() const {
        cout << "Name: " << name << endl;
    }
};

class Student : virtual public Person {
protected:
    string program;

public:
    Student(const string& n, const string& p) : Person(n), program(p)
{}
    void print() const override {
        Person::print();
        cout << "Program: " << program << endl;
    }
};

class Teacher : virtual public Person {
protected:
    string title;

public:
    Teacher(const string& n, const string& t) : Person(n), title(t) {}

    void print() const override {
        Person::print();
        cout << "Title: " << title << endl;
    }
};

class TA : public Student, public Teacher {
protected:
    double salary;

public:
    TA(const string& n, const string& p, const string& t, double s)
        : Person(n), Student(n, p), Teacher(n, t), salary(s) {}

    void print() const override {
        Student::print();
        Teacher::print();
        cout << "Salary: " << salary << endl;
    }
};

int main() {
    Student s1("Aslam", "BSCS");
    Teacher t1("Zahid", "Assistant Professor");
    TA ta1("Nasir", "BSEE", "TA", 1000);

    s1.print();
    t1.print();
    ta1.print();

    return 0;
}
```

OUTPUT:

```
Output

/tmp/NxJ3tRAbgo.o
Name: Aslam
Program: BSCS
Name: Zahid
Title: Assistant Professor
Name: Nasir
Program: BSEE
Name: Nasir
Title: TA
Salary: 1000
```